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INTRODUCTION

In accordance with the City Auditor's 1996-97 Audit Workplan, we audited the Integrated Waste Management (IWM) services the Environmental Services Department (ESD) provides. This is the fourth report in a series that included an audit of the Utility Billing System, a review of Commercial Solid Waste Franchise and AB 939 Fees, and a review of Landfill Fees & Taxes. We conducted this audit in accordance with generally accepted government auditing standards and limited our work to those areas specified in the Scope and Methodology section of this report.

The City Auditor's Office thanks the IWM division of the ESD, the Treasury Division of the Finance Department, and the Code Enforcement Division and Local Enforcement Agency of the Planning, Building and Code Enforcement Department for their time, information, insight and cooperation during the audit.

BACKGROUND

The Integrated Waste Management Division (IWM) of the Environmental Services Department (ESD) administers residential garbage and recycling collection services, residential yard waste collection and processing services, household hazardous waste disposal service, commercial solid waste and recyclable collection franchise activities, the City of San Jose's solid waste disposal contract, a market development program, and citywide solid waste collection services.

The Treasury Division (Treasury) of the Finance Department administers the collection of various taxes and fees. Treasury is responsible for enforcing a variety of revenue generating provisions of the Municipal Code.

The Code Enforcement Division of the Planning, Building and Code Enforcement Department enforces City ordinances that promote the health, safety, and appearance of the City's environment.

The Local Enforcement Agency (LEA) is part of the Planning, Building and Code Enforcement Department. The LEA performs permitting, inspection, and enforcement duties for solid waste facilities in the City of San Jose.

Major Accomplishments

The Administration has provided the Auditor's Office with a memorandum of major program accomplishments. According to the ESD, the IWM's accomplishments for 1995-96 and 1996-97 include:

- Based on the California Integrated Waste Management Board's (CIWMB) diversion calculation method, San Jose's commercial sector diverted 42.8 percent of its solid waste in calendar year 1995. San Jose's 1990 commercial diversion rate was 11 percent.
- The residential curbside program will record a diversion rate of approximately 45 percent. Over 85,000 tons of recyclables and 108,000 tons of yard trimmings will have been collected from single and multi-family residences in the City.

- In May 1997, the CIWMB approved the first annual report that IWM must submit each year until 2000 in compliance with AB 939. San Jose achieved an overall diversion rate of 43.6 percent for 1995, exceeding the State mandate of 25 percent by the end of 1995.
- IWM contract staff successfully renegotiated all residential collection contracts, and the disposal agreement that extended all collection contracts to June 30, 2002, and netted a \$4.5 million savings to the IWM Fund.
- Provided technical assistance on hauling services, waste reduction, recycling, and procurement of recycled products to 700 businesses in 1995-96 and 4,000 businesses in 1996-97.
- Conducted 43 waste assessments as part of a pilot program to help businesses analyze their solid waste and waste-generating processes in order to find opportunities for waste reduction, re-use, and recycling.
- Developed and implemented a 'voluntary franchise suspension' system for inactive CSW haulers in order to reduce staff time spent collecting and processing monthly 'zero reports' from franchised haulers not currently doing business in San Jose.
- Conducted annual Recycle Plus public opinion survey in May 1997. Survey results showed that the program is well received with 86 percent stating that they are satisfied with the way that the program collects their recyclables.
- Organized the first ESD sponsored Earth Day event held at Prusch Farm Park in April 1997. Approximately 2,000 attendees received information on waste prevention, water conservation, and other ESD programs in a fun and educational environment.
- Held two very successful home composting bin truckload sales in 1996. Approximately 2,000 bins have been sold. Staff is continuing to work with the Conservation Corps to provide an improved system of distributing bins to the public during 1997.
- Implemented a compostable bag pilot program in April 1997 to test the collection of yard trimmings in compostable plastic and kraft paper bags. Approximately 2,100 households are in the pilot program and roughly 10 percent are participating. The pilot will continue through

October, and will provide information to help determine whether citywide collection of yard trimmings in bags is a viable option for reducing the amount of residue left on the street.

- Recycle Plus is being featured in the United States Environmental Protection Agency “Pay-As-You-Throw” video project. The video will feature programs nationwide that have implemented variable rate structures to encourage recycling and reuse.
- IWM coordinated and provided flood response to several neighborhoods and four mobile home parks in January 1997. Work included: staffing IWM command center/communications; attending training, briefings, strategic planning meetings, and daily debriefings; responding to field locations; scheduling debris bin placements; assisting residents in removing and/or discarding flood-ruined items into debris bins; monitoring items being placed into bins to ensure items were landfillable; tracking bulky goods and arranging for their pickup; and providing information to emergency response centers.

IWM Organization

As shown in Chart I, IWM is organized in four sections: Administration, Civic Services, Commercial Solid Waste Services, and Residential Services.

CHART 1
ENVIRONMENTAL SERVICES DEPARTMENT
INTEGRATED WASTE MANAGEMENT



SCOPE AND METHODOLOGY

The objective of our review of the Integrated Waste Management Division (IWM) of the Environmental Services Department (ESD) was to verify compliance with the Municipal Code regarding the (1) administration of commercial solid waste (CSW) franchises, (2) accumulation, collection, and transportation of solid waste, and (3) management of the residential waste contracts.

We met with IWM to determine the scope of their responsibilities for administering Recycle Plus and commercial solid waste programs. We reviewed CSW franchise agreements and the contracts with Recycle Plus haulers. We interviewed both Recycle Plus and franchised CSW haulers, observed their solid waste collection processes, and reviewed the monthly reports they are required to submit. We also surveyed other jurisdictions to compare solid waste collection programs.

We documented the Treasury Division of the Finance Department's procedures for collecting, processing and verifying late payments. In addition, we met with the Code Enforcement Division and the Local Enforcement Agency of the Planning, Building and Code Enforcement Department to determine the scope of their responsibilities for enforcing City solid waste and recycling ordinances.

We met with officials from GreenTeam and USA Waste of San Jose (formerly known as Western Waste Industries) to determine the appropriateness of incentive payment adjustments, and reviewed their processing of recyclable sales transactions. We also reviewed ESD Administrative Services division audit procedures and recommended incentive payment adjustments.

We reviewed the methodology the ESD utilized to estimate the costs of containerized yardwaste collection services. We also interviewed representatives from Browning Ferris Industries, Green Waste Recovery, Inc., and Otto Industries regarding current yardwaste collection costs.

We performed limited testing to determine the accuracy and reliability of information in the various computer reports we used during the audit. We did not review the general and specific

application controls for the computer systems used in compiling the various computer reports we reviewed.

FINDING I

THE CITY SHOULD IMPROVE ITS OVERSIGHT OF COMMERCIAL SOLID WASTE FRANCHISE AND AB 939 FEES

Commercial Solid Waste (CSW) haulers remit to the City of San Jose (City) about \$16 million per year in franchise and AB 939 fees. CSW haulers remit these fees on a self-reporting basis. Our review revealed that although the Environmental Services Department (ESD) Audit Unit is working to bring audits current, of the \$18.8 million in remittances that the City received in 1994-95, the ESD has only audited \$105,000 or 0.6 percent. In addition, our review revealed that

- Treasury does not always document the timeliness of remittances;
- Reporting requirements for inactive CSW haulers are burdensome;
- CSW hauler contracts do not always comply with the Municipal Code; and
- The ESD has not reviewed hauler contracts with customers for compliance with the Municipal Code.

The City imposes a three year record keeping requirement on CSW haulers. Therefore, the ESD should audit CSW hauler remittances for 1994-95 before the three year record keeping requirement expires. Further, the Finance Department should retain the postmarked envelope as proof of late payment, note the postmark date on the face of the Commercial Solid Waste Collector's Monthly Report, and maintain complete files. In addition, the ESD should streamline the voluntary suspension and reinstatement process, and encourage inactive haulers to use that process. Moreover, the City Attorney should evaluate the feasibility of revising Municipal Code Section 9.10.1630, to provide for the automatic termination of a CSW contract if the CSW hauler's franchise is not renewed. Finally, the ESD should regularly audit CSW franchisee contracts with commercial solid waste generators to ensure compliance with Municipal Code requirements. By so doing, the City will have added assurance that it is receiving all of the CSW franchise and AB 939 fees to which it is entitled, improve the administration of CSW hauler activity oversight, and improve CSW hauler compliance with the Municipal Code.

City Fees On CSW Haulers And Generators

Prior to 1995, the City franchised one hauler on an exclusive basis for commercial garbage collection services. The City Council set the customer rates. The City also franchised rubbish collection services on a non-exclusive basis. The rubbish haulers set their customer rates. Beginning in January 1995, the City merged the garbage and rubbish franchise into an integrated free market CSW franchise system. The City granted CSW franchises on a non-exclusive basis, and the City allowed CSW franchisees to set their own customer fees without review or approval.

CSW haulers remit monthly franchise fees to the City's General Fund for the privilege of doing business in the City. For 1995-96, the CSW franchise fee was 28.28 percent of a hauler's gross receipts in excess of \$250,000. For 1996-97, the City Council approved the ESD's proposal to change to a volume-based fee of \$1.64 per cubic yard in excess of 43,000 cubic yards per year.¹

CSW haulers also remit monthly CSW AB 939 fees to the Integrated Waste Management (IWM) Fund. The California Integrated Waste Management Act of 1989 (commonly known as AB 939) requires cities and counties to prepare, adopt, and implement source reduction and recycling plans, and authorizes them to collect fees to cover their costs in doing so. For 1995-96, the City's CSW AB 939 fee was 30 percent of waste generator paid gross receipts. For 1996-97, the City also changed this fee to a volume basis of \$1.77 per cubic yard collected.¹ Although the haulers remit the AB 939 fees to the IWM Fund, the garbage and rubbish generators are the parties that are actually responsible for paying for waste reduction and recycling programs. The structure of both the CSW fee and the AB 939 fee is designed to act as a financial incentive to encourage San Jose businesses to recycle and reduce their solid waste.

Revenue From CSW Franchise And CSW AB 939 Fees

Table 1 shows that the City has collected nearly \$50 million dollars in revenue from CSW franchise and CSW AB 939 fees in the last three years. CSW haulers remitted these fees based on

¹ In June 1997, the Office of the City Auditor issued A Review of Commercial Solid Waste Franchise and AB 939 Fees which identified a number of problems associated with the ESD's methodology to convert from a revenue to a volume basis for CSW franchise and AB 939 fees.

self-reported gross receipts or cubic yards. In other words, the CSW haulers calculate the amounts they owe to the City.

TABLE 1
REVENUE FROM CSW HAULERS

	1994-95	1995-96	1996-97 (*)	Total
CSW franchise fees	\$11,900,000	\$7,900,000	\$6,950,000	\$26,750,000
CSW AB 939 fees	6,900,000	8,000,000	8,250,000	23,150,000
Total	\$18,800,000	\$15,900,000	\$15,200,000	\$49,900,000

(*) Includes one-time windfall of \$402,000 and \$1,142,000 in CSW franchise and CSW AB 939 fees, respectively.

The ESD Is Responsible For Verifying CSW Hauler Fees

The Finance Department is responsible for processing CSW Franchise and AB 939 fee remittances. The IWM division of the ESD monitors the information CSW haulers include with their remittances on an on-going basis. In addition, the ESD Administrative Services Audit Unit (Audit Unit) is responsible for verifying the information the CSW haulers use to calculate their fees on the Commercial Solid Waste Collector’s Monthly Report. Specifically, the Audit Unit is responsible for conducting field audits in the CSW haulers' offices to verify volume information. ²

² Previously, when fees were calculated based on gross receipts, the Audit Unit was responsible for verifying gross receipts. According to the Audit Unit, their fieldwork included the evaluation of internal controls, preparation of cash receipt summaries and testing of cash transactions.

The IWM commercial audit criteria outlined in an internal memorandum dated October 1995 specifies that CSW franchisees will be audited with the following frequency:

TABLE 2
ESD CSW FRANCHISE AUDIT CRITERIA

Gross Receipts	Audit Frequency
\$1,000,000 and above	Once a year
\$50,000 - \$1,000,000	Once every two years
\$0 - \$50,000	Once every three years

This same memorandum also specified other criteria that can supersede gross revenue as an audit trigger, including: significant drops in monthly fee revenue, improper payment or billing of fees, CSW tonnage to gross receipts comparisons, CSW tonnage to mixed recyclable tonnage comparisons, late reports or missing reports, and/or operating without a franchise.

The ESD Has Only Audited 0.6 Percent Of 1994-95 Fee Revenue

Our review revealed that in spite of the above audit criteria, the Audit Unit audited only \$105,000 or 0.6 percent of the \$18.8 million in CSW revenues that the City received during 1994-95. It should be noted that the Audit Unit has audited \$7.6 million or 48 percent of the \$15.9 million in CSW revenues that the City received during 1995-96. These audits are listed in Table 3.

TABLE 3
ESD AUDITS OF CSW HAULER REMITTANCES FOR 1994-95 AND 1995-96

CSW Haulers Audited	1994-95	1995-96
\$99 Debris Box	\$ 3,121	\$ 7,957
Biagini Waste	4,123	0
BFI	0	Started
Custom Disposal	4,305	0
Hollister Disposal	89,689	0
JHM Services, Inc	0	0
Ken's Hauling	2,353	0
Linda Romero	1,479	0
Waste Management	0	7,592,836
Total	\$ 105,070	\$ 7,600,793

Audits are important because CSW haulers remit CSW franchise and AB 939 fees on an entirely self-reported basis. Accordingly, there is a potential for the City to incur significant revenue losses. For example, in May 1994 and June 1995, audits of a former CSW hauler, Mission Trail Waste Systems, Inc., revealed misallocated franchise fees plus penalties and interest totaling over \$600,000. Specifically, the audits found that the hauler was reporting billings instead of gross receipts, and identified service charges to (1) customers located in the City but erroneously identified to the City of Santa Clara and (2) customers located in the City but excluded from the remittance reports. These audits were for remittances to the City between 1991 and 1994, and are still pending.

In addition, a January 1997 audit of Waste Management of Santa Clara County (WMSCC), revealed that WMSCC record keeping needed to be improved and that Treasury did not have documentation that all payments were timely. According to ESD auditors, they were only able to review six month's worth of records during their audit, and had to do reasonableness tests on remittances for the remainder of the year. In our opinion, these audit

results demonstrate the importance of regular audits to ensure hauler compliance with CSW franchise and AB 939 fee remittance requirements.

Audits Of CSW Franchises Have Been Delayed

Audits of the two major CSW franchises -- Browning Ferris Industries (BFI) and WMSCC -- have been delayed. The largest CSW franchisee is BFI, which remits 51 percent of total CSW franchise and AB 939 fees. ESD staff cannot recall the last time it audited BFI. An audit of BFI that was scheduled for August 1996 was delayed because the company's controller was murdered in October 1995. In August 1997, the ESD started an audit of BFI remittances for 1995-96 and 1996-97.

WMSCC is the City's second largest CSW franchisee. WMSCC's remittances contribute about 46 percent of the City's total. The ESD attempted an audit of WMSCC remittances for 1994-95 in November 1995. Apparently, the accounting records were not formatted in a manner that was conducive to an audit. According to the ESD Audit Unit, WMSCC did not have a list of cash collections to support monthly gross receipts generated in San Jose. Instead, the cash receipts journal showed all monthly cash received from all jurisdictions. Additionally, WMSCC did not maintain its records locally, as the franchise agreement required. Instead, WMSCC kept its records at its headquarters in Irvine, California. WMSCC stated that it could not provide the information formatted in the manner the auditors requested without incurring substantial cost. The ESD terminated the audit in March 1996. According to ESD audit staff, the ESD decided not press the issue with WMSCC but did develop general record keeping guidelines for all CSW haulers to avoid similar situations in the future. The ESD will not have assurance that the guidelines are being followed until future audits are conducted.

Three Year Record Keeping Requirement

ESD audit staff are currently working on audits of 1995-96 and 1996-97 remittances. At the time of our review, staff had decided not to pursue further audits of 1994-95 remittances. The City's minimal verification of fee revenue for 1994-95 provides little assurance that self-reported remittances were accurate and/or timely, and exposes the City to a potential loss of revenue. Regular audits are necessary to ensure that CSW haulers have controls in place to compile and report information properly. The City imposes a three year record keeping requirement on CSW

haulers. Therefore, the ESD should audit CSW hauler remittances for 1994-95 before the three year record keeping requirement expires.

#1 We recommend the ESD audit CSW franchisees to ensure that 1994-95 franchise and AB 939 fees were properly remitted. (Priority 2)

Fee Remittance Processing And Late Fees

On a monthly basis, CSW haulers remit both the CSW franchise and CSW AB 939 fees directly to the Treasury Division (Treasury) of the Finance Department on a single Commercial Solid Waste Collector's Monthly Report. Specifically, CSW haulers must remit fees on the first day of the second month after services are provided. For example, fees related to services provided in January are due on March 1st. A fee remittance received after its due date is considered late. For mailed remittances and reports, the postmark is used to determine the date received. Treasury is responsible for computing the Municipal Code prescribed penalties and interest charges based on the number of days the remittance is late. These penalties and interest are substantial. If Treasury does not receive the remittance by the due date, the penalty amount is 10 percent of the late remittance. In addition, interest accrues at a rate of 10 percent per year.

Treasury Needs To Improve Remittance Verification

Our test work of 1995-96 remittances revealed procedural problems with Treasury's remittance verification. Treasury's procedures clearly state that *"if the return is received after the 1st, save the envelope, attach it to the remittance form, write on the form the date of the postmark"*. However, we noted two instances where Treasury received the remittance after the due date. Although Treasury banking records indicate that the payments may have been mailed timely, Treasury did not retain the postmarked envelope. As a result, there is no way to document if the remittance was mailed late. An ESD audit of WMSCC for the same period revealed the same problem. The ESD discussed this matter with Treasury in order to remedy the situation. However, when we subsequently reviewed CSW hauler remittances for 1996-97, we found that the same procedural problem still existed. Specifically, we found another instance where Treasury received a remittance late but did not retain the postmarked envelope as proof that the hauler was late in remitting payment.

It should be noted that at the time of our review, Treasury was forwarding copies of the Commercial Solid Waste Collector's Monthly Report to IWM for late payment penalty and interest assessment. Because Treasury receives many of the reports after the due date, Treasury is supposed to note the postmark date on the face of the report. However, we found very few instances where Treasury actually noted the postmark on these reports. According to ESD staff, this practice made it difficult for them to determine if any late payment penalties or interest should be assessed. Treasury has since reassumed responsibility for computing, assessing, and collecting late payment penalties and interest.

Our review also revealed that Treasury's files were not complete. For example, we could not find in Treasury's files several CSW hauler reports for the month of February 1997. We were, however, able to find these reports in IWM's files.

#2 We recommend the Finance Department retain the postmarked envelope as proof of late payment, note the postmark date on the face of the Commercial Solid Waste Collector's Monthly Report, and maintain copies of the Commercial Solid Waste Collector's Monthly Reports.
(Priority 2)

Reporting Requirements For Inactive CSW Haulers Are Burdensome

The Municipal Code requires all CSW franchisees to remit Commercial Solid Waste Collector's Monthly Reports. "Inactive" CSW haulers also must submit these reports every month even if they collected no material. The only exception to this rule is for those CSW haulers who have voluntarily suspended their franchise. However, our review of the Commercial Solid Waste Collector's Monthly Reports on file at Treasury revealed that some CSW haulers who had not voluntarily suspended their franchise were not submitting the required monthly reports. According to ESD staff, there are several CSW haulers that do not have regular hauling activity but maintain their franchise "just in case". As a result, these CSW haulers may be reluctant to voluntarily suspend their franchise because of the paperwork involved to start doing business again.

Our review also revealed that the Commercial Solid Waste Collector's Monthly Reports that inactive CSW haulers submit do not contain any useful information. Specifically, inactive

CSW haulers merely fill in zeros throughout the monthly report. According to IWM staff, they merely file these inactive CSW hauler Commercial Solid Waste Collector's Monthly Reports once they are received. By requiring all CSW haulers to submit these monthly reports, IWM is able to track which CSW hauler reports are late and therefore subject to the ESD assessing a late fee. However, rather than assessing late fees for blank reports, in our opinion the ESD should streamline the voluntary suspension and reinstatement process, and encourage inactive haulers to use the suspension process.

#3 We recommend the ESD streamline the voluntary suspension and reinstatement process for CSW haulers, and encourage inactive haulers to use that process. (Priority 3)

CSW Hauler Contracts Do Not Always Comply With The Municipal Code Requirement That The Contract Term Not Extend Beyond The Term Of The Franchise

Municipal Code Section 9.10.1630 requires that *"the term of the [hauler-customer] contract shall not extend beyond the term of the franchise."* This clause guards against haulers continuing to do business in the City unless their franchise is renewed. However, it is not being followed. Our review of the two largest CSW hauler's contracts revealed that they do not end their contracts at the end of the franchise term. In fact, CSW franchises are renewable every two years, and the term of one of the contracts we reviewed was for three years with severe penalties for early termination, and additional penalties for terminating a renewal term. If enforced, this clause in the Municipal Code would require all CSW haulers to terminate and renew all their customer contracts the day after the City Council renewed the hauler's franchise. In our opinion, it would be more practical to require that CSW haulers write their customer contracts such that the contracts automatically terminate if the CSW haulers' franchises were not renewed.

#4 We recommend the City Attorney's Office evaluate the feasibility of revising Municipal Code Section 9.10.1630 to provide for the automatic termination of CSW hauler-customer contracts if the CSW hauler's franchise is not renewed. (Priority 3)

**CSW Hauler Contracts Do Not Always Comply
With The Municipal Code Requirements
Regarding Termination And Renewal**

Beginning in January 1995, the City initiated an integrated free market CSW franchise system. Prior to 1995, the ESD had received complaints from commercial solid waste generators about the noncompetitive practices that some CSW haulers were using. Specifically, some commercial solid waste generators reported to the ESD that it was difficult to switch CSW service providers because of long-term and automatically renewed service contracts. Therefore, to increase competition among CSW haulers and give more flexibility to commercial solid waste generators, the City added Municipal Code Section 9.10.1630, which requires:

Any contract between a grantee and any generator/customer for commercial solid waste collection services provided pursuant to a franchise granted under this part shall . . . provide for cancellation of the contract by the generator/customer upon not less than thirty days notice in any case where the cancellation occurs not less than six months after the initial date of the contract . . . [and] provide not less than sixty days notice to the generator/customer before any automatic renewal of the contract . . .

During the course of our audit we reviewed sample contracts from the City's two largest CSW haulers. Both sample contracts contained terms that conflicted with the above clause from the Municipal Code. Specifically, one contract did not state that the hauler must provide 60 days notice before automatically renewing a contract. Instead, the contract provided for 30 days notice before automatic renewal. The other contract required a 60-day notification before contract termination for both the hauler and the generator/customer. The Code, however, specifies that the customer be allowed to give the hauler a 30-day termination notice. Furthermore, neither CSW hauler contract specified that the term of the contract could not extend beyond the term of the CSW hauler's franchise.

The ESD Does Not Review Individual Hauler Contracts

Neither IWM contract managers nor the Audit Unit review individual contracts between CSW haulers and their customers for compliance with Municipal Code requirements. In fact, IWM contract management procedures do not require reviews of these contracts. In addition, according to the Audit Unit, reviewing CSW hauler-generator contracts is not included in the scope of their audit program. Now that CSW contracts are executed between haulers and commercial

solid waste generators, it is important that the ESD verify that the language in these contracts between CSW haulers and their customers accurately reflect Municipal Code requirements.

#5 We recommend the ESD regularly audit CSW franchisee contracts with commercial solid waste customers to ensure compliance with Municipal Code requirements. (Priority 3)

CONCLUSION

Our review revealed that of the \$18.8 million in 1994-95 franchise and AB 939 fee remittances, the ESD has only audited \$105,000 or 0.6 percent. In addition our review revealed that Treasury does not always document the timeliness of fee remittances, reporting requirements for CSW haulers are burdensome, CSW haulers do not always comply with the Municipal Code, and the ESD does not review CSW hauler contracts for compliance with Municipal Code requirements. In our opinion, the ESD should perform regular audits to ensure the CSW hauler franchise and AB 939 fee remittances are proper. Further, the Finance Department should retain the postmarked envelope as proof of late payment, note the postmark date on the face of the Commercial Solid Waste Collector's Monthly Report, and retain copies of the CSW monthly reports. In addition, the ESD should streamline the voluntary suspension and reinstatement process, and encourage inactive CSW haulers to use that process. Moreover, the City Attorney should evaluate the feasibility of revising Municipal Code Section 9.10.1630 to provide for the automatic contract termination if the CSW hauler's franchise is not renewed. Finally, the ESD should regularly audit CSW franchisee contracts with CSW customers to ensure compliance with Municipal Code requirements. By so doing, (1) the City will have added assurance that it is receiving all of the CSW franchise and AB 939 fees to which it is entitled, (2) unnecessary reporting requirements will be eliminated, and (3) CSW hauler compliance with Municipal Code requirements will be improved.

RECOMMENDATIONS

We recommend that the ESD:

Recommendation #1:

Audit CSW franchisees to ensure that 1994-95 franchise and AB 939 fees were properly remitted. (Priority 2)

In addition, we recommend that the Finance Department:

Recommendation #2:

Retain the postmarked envelope as proof of late payment, note the postmarked date on the face of the Commercial Solid Waste Collector's Monthly Report, and maintain copies of the Commercial Solid Waste Collector's Monthly Reports. (Priority 2)

In addition, we recommend that the ESD:

Recommendation #3:

Streamline the voluntary suspension and reinstatement process for CSW haulers, and encourage inactive haulers to use that process. (Priority 3)

Furthermore, we recommend the City Attorney's Office:

Recommendation #4:

Evaluate the feasibility of revising Municipal Code Section 9.10.1630 to provide for the automatic termination of CSW hauler-customer contracts if the CSW hauler's franchise is not renewed. (Priority 3)

Finally, we recommend that the ESD:

Recommendation #5:

Regularly audit CSW franchisee contracts with commercial solid waste customers to ensure compliance with Municipal Code requirements. (Priority 3)

FINDING II

THE CITY'S REGULATION OF COMMERCIAL SOLID WASTE AND RECYCLABLE HAULERS CAN BE IMPROVED

The City of San Jose (City) issues franchises to commercial solid waste (CSW) and commercial mixed recyclable haulers on a non-exclusive basis. Our review revealed that the City's regulation of commercial recyclable haulers is overly burdensome, bureaucratic, and non-value added. Specifically, franchise and reporting requirements for CSW and mixed recyclable haulers are duplicative and the ESD's oversight of recyclable haulers overlaps with the regulatory concerns of other agencies. In addition, the current system excludes both recyclable residue and self-hauled non-franchised solid waste from franchise and AB 939 fees. Furthermore, the City's mixed recyclable and CSW tonnage and fee remittance reports are confusing. Our review also revealed that insurance certificates were missing or out of date for 3 of 13 CSW franchises and 2 of 12 mixed recyclable franchises. Finally, we noted that the City did not properly assess \$2,100 in late fees on hauler activity reports. In our opinion, the City should (1) eliminate duplicative franchise and reporting requirements for CSW and mixed recyclable haulers, (2) review its current policy of excluding both self-haulers and recycling residue from franchise and AB 939 fees that other haulers and generators must pay, (3) clarify and simplify CSW and recyclable hauler reporting requirements, and (4) update its written procedures regarding insurance requirements and late or not filed recyclable franchise activity reports. By so doing, the City will eliminate unnecessary bureaucratic regulations and improve its regulation of CSW and recyclable haulers.

The City Regulates Commercial Waste Haulers

Unlike the City's mandatory Recycle Plus program for residential properties, commercial customers in the City contract independently with a CSW hauler and a recyclable hauler. The haulers are subject to Municipal Code franchising requirements. Table 4 summarizes the City's CSW franchise and Mixed Recyclable franchise requirements.

TABLE 4
CSW AND MIXED RECYCLABLE FRANCHISE REQUIREMENTS

	CSW Franchise	Mixed Recyclable Franchise
Fee remittance report	Monthly	None
Activity report	Fee remittance report includes yardage of bins in service	Monthly tonnage reports
Late fees	\$50 to \$100 per report plus penalties and interest on the amount due	\$50 to \$100 per report
Insurance requirements	Three levels of insurance depending upon the type of equipment and accumulated yardages	

On August 5, 1997, the City Council approved an ordinance amending Chapter 9.10 of the Municipal Code to eliminate the requirement that collectors of source separated commercial recyclables obtain a Single Recyclables Collection Permit from the City.

The Commercial Section in the Integrated Waste Management (IWM) division of the Environmental Services Department (ESD) manages the franchise system. The duties of the six FTEs in the Section include:

- Issuing and renewing commercial franchises,
- Collecting monthly volume information from the franchised waste haulers and tracking monthly remittances,
- Redesigning CSW and recycling systems,
- Performing market development and outreach, and
- Responding to requests for special projects or information referrals from the City Council.

CSW Franchises

CSW haulers remit monthly franchise fees to the City’s General Fund for the privilege of doing business in the City. CSW haulers are also responsible for collecting and remitting the monthly Source Reduction and Recycling Fees (commonly known as ‘AB 939 fees’) that waste generators pay. AB 939 fees go to the IWM Fund to cover the City’s cost of preparing and

implementing source reduction and recycling plans. Currently, there are 27 CSW franchises. The Municipal Code has four categories of service for CSW franchisees. These categories are:

- **CATEGORY A:** Weekly CSW service for commercial businesses including garbage³, rubbish⁴, and mixtures of garbage and rubbish generated at commercial premises located in the City.
- **CATEGORY B:** Temporary rubbish service for businesses (requires rubbish to be segregated from garbage, and stored in separate containers).
- **CATEGORY C:** Residential rubbish debris box services, and on-site cleanups and rubbish hauling for businesses and residences.
- **CATEGORY D:** Miscellaneous solid waste collection services.

More than half of CSW haulers provide service for at least three of the above CSW categories. Prior to July 1996, IWM required CSW franchises to remit two separate reports to the City – a monthly fee remittance report and a monthly activity report. Beginning in July 1996, IWM combined the two reports into a single remittance report based on volume.

Commercial Mixed Recyclable Franchises

Commercial mixed recyclers collect more than one type of recyclable mixed together in one recycling bin. IWM has established four categories of commercial mixed recyclables (industrial, office, restaurant, and construction and demolition) and an open classification for items subject to the ESD Director's approval. Commercial mixed recycling collectors are required to obtain a mixed recyclable collection franchise from the City, and submit monthly tonnage reports to IWM. The franchise fee is zero. Currently, there are 15 franchised collectors of mixed recyclables.

³ Garbage is defined as wet materials such as food waste, food packaging, and any other putrescible or easily decomposable waste material that is likely to attract flies, vermin, birds, or rodents.

⁴ Rubbish is defined as dry material such as wood, green waste, rocks, paper, or concrete.

Required Hauler Reports Are Burdensome

Although mixed recyclable franchises do not pay franchise fees, the City still requires them to submit monthly collection activity reports. These reports require franchisees to provide information for as many as five classes of mixed recyclables regarding tons collected, tons recycled, tons of residue (the amount not recycled), and percent of residue. The City also requires the franchisee to list the processing or purchasing site for each mixed recyclable material class by tonnage, the quantity of residue sent to each waste disposal site, the number and total monthly capacity of all bins and roll-off boxes serviced, and the number of pick-ups. In addition, if the franchisee converted the reported weight of the mixed recyclable materials from volume data to weight, the City requires the franchisee to develop and show the formulas, conversion factors or other techniques they used in making the conversion.

Our review revealed that the City requires those CSW haulers that provide mixed recyclable services to their customers to maintain multiple franchises. Specifically, at the time of our review, there were 13 CSW haulers who had both CSW and Mixed Recyclable franchises. Moreover, 13 out of 15 Mixed Recyclable franchisees also had CSW franchises. As a result, CSW haulers spend considerable time filling out activity reports for the City.

The Usefulness Of The Information In The Recyclable Hauler Reports Is Questionable

Our review revealed that the usefulness of the information the City requires the recyclable haulers to submit to IWM is questionable. Specifically, the ESD does not prepare any formal reports using this information. In fact, the IWM staff we interviewed consider the recyclable hauler reports for some time periods to be worthless for any analytical purpose because of errors in the reports such as volume to weight conversion errors. Furthermore, the ESD usually uses information about waste generators from other sources to make policy decisions about recycling programs. For example, the ESD used a UCLA waste study by industry type to develop an outreach program for recommending waste reduction strategies to individual waste generators.

The primary reason the information on the recyclable hauler reports is of questionable usefulness is that recyclable tonnage information is no longer needed to calculate AB 939 diversion rates. AB 939 requires local jurisdictions to divert 25 percent of solid waste from landfills and

transformation facilities by 1995. Accordingly, the California Integrated Waste Management Board (CIWMB) required local jurisdictions to report to the CIWMB the tons of waste diverted and/or recycled. Because such information was not readily available, many jurisdictions were forced to estimate tons of waste diverted and/or recycled when they reported to the CIWMB. Subsequently, the CIWMB revised its reporting requirements so that local jurisdictions calculate tons of waste diverted based upon tons of waste disposed compared to an adjusted base year. Thus, the City no longer needs to collect or compile the tonnage information on recyclables included in the CSW hauler reports in order to meet its CIWMB reporting requirements.

Overlapping Regulation

The City's regulation of commercial waste and recycling haulers is designed to address concerns about health and safety, and protection of the environment. In practice the City's oversight of recyclable haulers overlaps with the regulatory concerns of the CIWMB. The Local Enforcement Agency (LEA) of the City's Planning, Building, and Code Enforcement Department is responsible for enforcement of the regulations the CIWMB promulgated. Specifically,

The LEA is Certified by the CIWMB as the primary permitting and enforcement agency for the enforcement of 'state minimum standards' as required under California Code of Regulation, Title 14... The LEA is also certified to enforce provisions of local codes and ordinances relating to the protection of public health and safety, and the environment related to the improper disposal, transportation, handling, and processing of solid waste.

Under current CIWMB guidance, the LEA regulates mixed recyclable haulers who sort materials on site or produce more than 10 percent residue. As a result, most of the City's mixed recyclable franchises must deal with several sets of regulations and reporting processes. This can be cumbersome. For example, IWM's categories for mixed recyclable franchise reports are based on type of material, while the LEA is primarily concerned with residue levels.

Similarly, the ESD requires detailed information from haulers on the types and status of all vehicles used to transport CSW and mixed recyclables. However, both the California Highway Patrol and the Santa Clara County LEA already inspect hauler vehicles on a regular basis. In addition, State law requires the City's LEA to monitor vehicles used to haul CSW. Furthermore, the City's LEA is responsible for handling complaints about CSW hauling vehicles. In our opinion, the ESD may not need to separately gather and monitor that information.

*Only Half Of The Jurisdictions We Surveyed
Required Recyclable Franchises Or Permits*

In the course of our audit, we conducted a survey of seven other jurisdictions. Of the seven jurisdictions we surveyed, six allowed businesses to select their own commercial recyclable haulers. However, only three out of those six jurisdictions required commercial recyclable haulers to be franchised or permitted. Table 5 summarizes these results.

TABLE 5

**SUMMARY OF SURVEYED JURISDICTIONS' REGULATION
OF COMMERCIAL RECYCLABLE HAULERS**

Jurisdiction	Businesses Select Their Own Recyclable Haulers	Commercial Recyclable Haulers Must Be Franchised Or Permitted
Fremont	√	√
Phoenix	√	
Portland	√	√
Sacramento	√	
San Diego	√	√
Seattle	√	

The City Should Eliminate Duplicative Franchise And Reporting Requirements For CSW And Mixed Recyclable Haulers

Recognizing the fact that the CSW and mixed recyclable franchises are overlapping and that the reports may be burdensome, the ESD is considering submitting to the City Council a proposal to combine the CSW and mixed recyclable franchises into one integrated franchise. In addition, the ESD is considering changing the categories of mixed recyclable franchises to make them more flexible. In our opinion, this would eliminate the duplicative franchise and reporting requirements that we observed, and could dramatically simplify reporting requirements for CSW franchisees that also haul mixed recyclables. It should be noted that we estimate the City collects less than \$500 per year in application and renewal fees from commercial recyclable haulers.

#6 We recommend the City Council eliminate duplicative franchise and reporting requirements for CSW and mixed recyclable haulers. (Priority 3)

**The Current System Excludes
Recyclable Residue From Fees**

Our review also revealed that the City’s current regulatory structure does not address the fact that residue from recycling haulers escapes the fees and charges that other CSW haulers must pay. Recyclable collections usually include some residue that is disposed of as solid waste; this is particularly true of mixed recyclable collections that are more prone to “contamination”. According to IWM, residue amounts for mixed recyclable haulers are either “zero” or “incidental”. Any amounts greater than zero would put recyclable haulers into the CSW category and subject to franchise fees. However, IWM has not substantiated its zero residue contention by physically examining mixed recyclable hauler loads. Furthermore, the LEA staff that we interviewed stated that a zero percent residue level for mixed recyclables is unreasonable and unenforceable. According to current State standards, recycling facilities generating more than 10 percent residue are subject to a certification process and monthly LEA inspections.

Since the City imposes no franchise fees for hauling recyclables, there is a danger that CSW haulers will claim that they are collecting mixed recyclables in order to avoid paying the CSW franchise and AB 939 fees. For example, one franchised CSW hauler began counting its residential debris box loads as mixed recyclables in order to avoid CSW franchise and AB 939 fees. In addition, the same recyclable hauler reported that this operation produced zero residue. As a result of this experience, the City Council enacted a new City ordinance that categorized all residential roll-off loads as CSW. IWM also initiated Municipal Code changes specifying that temporary roll-off box service at residential properties for major clean-up, remodeling, or construction projects be considered a “commercial” service subject to CSW franchise and AB 939 fees. Furthermore, mixed recyclable franchisees must pay CSW franchise fees and AB 939 fees on unauthorized categories of mixed recyclables.

According to IWM, recyclable hauler estimates of residue are probably unreliable. A review of mixed recyclable franchisee reports showed hauler-reported residue rates ranging from

0.06 percent to 43 percent. Moreover, many recyclable haulers use common processing sites where they dump their loads onto the floor of the facility for mixing with other recyclable haulers' loads. Thus, one CSW hauler's residues are eventually combined with a number of recyclable haulers' residues. As a result, the amount of recycling residue that escapes AB 939 fees for any one recyclable hauler cannot be estimated. Nonetheless, in our opinion, the City Council should review the current policy of excluding from CSW franchise and AB 939 fees commercial recyclable hauler and/or recyclable processor generated residue.

The Current System Also Excludes Self-Hauled Non-Franchised Solid Waste

Businesses that self-haul solid waste are also excluded from CSW franchising requirements and CSW franchise fees. These solid waste generators are also excluded from the AB 939 fees that other solid waste generators must pay. Because these businesses are excluded from franchise reporting requirements, the financial impact of the fee exemption for self-haulers cannot be estimated. However, it should be noted that according to the CIWMB,

Self-haul often includes not only residential waste, but also non-franchised commercial, industrial, and inert solid waste, such as construction/demolition wastes . . . [S]elf-haul waste often makes up between five and ten percent of a jurisdiction's waste stream.

In our opinion, the City Council should review its policy of excluding commercial self-haulers from CSW franchise and AB 939 fees.

#7 We recommend the City Council review the current policy of excluding from CSW franchise and AB 939 fees: (1) commercial recyclable hauler and/or processor generated residue, and (2) commercial solid waste self-haulers. (Priority 2)

The Required Reports Are Confusing

According to the CSW and recyclable haulers that we interviewed, the City's mixed recyclable reports and the CSW tonnage and fee remittance reports are confusing. Our review of these reports revealed numerous chronic CSW and recyclable hauler errors on the various forms. According to IWM's procedures manual, CSW and recyclable hauler mistakes on the required reports should be corrected and copied to the CSW and recyclable hauler for future reference. Our

review revealed that while IWM staff had noted corrections on erroneous CSW and recyclable hauler reports, they had not sent corrected copies to the haulers.

Insurance Certificates Were Missing

CSW and recyclable haulers must carry insurance as a condition of their franchise and/or permit. There are three levels of insurance based on type of equipment and accumulated yardages hauled. Table 6 summarizes the hauler insurance requirements.

TABLE 6

**CSW AND RECYCLABLE HAULER INSURANCE REQUIREMENTS
(Required coverage per occurrence)**

LEVEL	CRITERIA	GENERAL LIABILITY	AUTOMOBILE LIABILITY	EXCESS LIABILITY	WORKERS' COMPENSATION
1	Gross receipts over \$250,000 per year	\$1 million	\$1 million	\$5 million	\$100,000
2	Gross receipts less than \$250,000 per year, hauler uses heavy equipment	\$1 million	\$1 million	None	\$100,000
3	Gross receipts less than \$250,000 per year, and hauler uses light equipment	\$300,000	\$300,000	None	\$100,000

Our review of CSW franchisee insurance certificates revealed that insurance certificates were out of date or missing for:

- 3 out of 13 CSW franchises, and
- 2 out of 12 mixed recyclable franchises.

It should be noted that the City may combine the CSW and mixed recyclable franchises into one integrated franchise. In that eventuality, some of the above insurance requirements may change. In our opinion, the ESD should address the issue of required insurance certificates when it updates its written procedures.

The City Did Not Assess Late Fees On Hauler Activity Reports

Finally, our review revealed that City staff has put a low priority on verifying the timeliness and completeness of recyclable hauler reports. Specifically, we found that during 1995-96 the City did not assess late fees on 21 out of 33 mixed recyclable franchise activity reports that were either late or missing. Given late fees of \$100 per incident, we estimate that the City did not impose \$2,100 in late fees. In our opinion, the ESD should also address the issue of late or not filed recyclable franchise activity reports when it updates its written procedures for handling these reports.

#8 We recommend the ESD clarify and simplify CSW and recyclable hauler report forms, and update written procedures for handling those reports. (Priority 3)

CONCLUSION

Our review revealed that the City's regulation of commercial recyclable haulers is overly burdensome, bureaucratic, and non-value added. In our opinion, in order to relieve CSW and recyclable haulers of bureaucratic and non-value-added regulations and procedures, the City should eliminate duplicative franchise and reporting requirements for CSW and mixed recyclable haulers. In addition, the City should review its current policy of excluding self-haulers and recycling residue from the CSW franchise and/or AB 939 fees that other haulers and generators must pay. Finally, the City should clarify and simplify CSW recyclable hauler reporting requirements.

RECOMMENDATIONS

We recommend that the City Council:

Recommendation #6:

Eliminate duplicative franchise and reporting requirements for CSW and mixed recyclable haulers. (Priority 3)

Recommendation #7:

Review the current policy of excluding from CSW franchise and AB 939 fees: (1) commercial recyclable hauler and/or processor generated residue, and (2) CSW self-haulers. (Priority 2)

In addition, we recommend that the ESD:

Recommendation #8:

Clarify and simplify CSW and recyclable hauler report forms, and update written procedures for handling those reports. (Priority 3)

FINDING III

MUNICIPAL CODE PROVISIONS REGARDING UNFRANCHISED HAULERS SHOULD BE AGGRESSIVELY ENFORCED AND SCAVENGING COMPLAINTS SHOULD BE ACTIVELY ADDRESSED

Our review revealed that Municipal Code provisions regarding unfranchised haulers have not been aggressively enforced. It appears that this lack of enforcement has been due to a previous lack of effective enforcement authority, and a lack of coordination between the Code Enforcement Division (Code Enforcement) of the Planning, Building and Code Enforcement Department, the Integrated Waste Management Division (IWM) of the Environmental Services Department (ESD), and the City's franchised commercial solid waste (CSW) haulers. As a result, unfranchised CSW haulers may evade CSW franchise and AB 939 fees. Our review also revealed that the City did not pursue two-thirds of the complaints it received about scavenging because the complaining party did not provide sufficient information about the scavenger. Further, Code Enforcement has not coordinated their response to complaints about scavenging activities with the San Jose Police Department (SJPD). In our opinion, the Administration should improve coordination between Code Enforcement, IWM, and the SJPD, and determine the most effective way to actively pursue unfranchised haulers and respond to complaints about scavengers.

Activities Of The Code Enforcement Division

Code Enforcement is responsible for enforcing City ordinances that promote the health, safety, and appearance of the City's environment. Code Enforcement has about 42 inspectors who devote about 15 percent of their time to solid waste issues.

Code Enforcement has three levels of complaint response: priority, immediate, and routine. Code Enforcement uses warning letters as the first level response to its routine solid waste related complaints. In the case of a routine complaint, Code Enforcement usually warns the responsible party that they have 10 days to correct the alleged violation. Ideally within 10 days, but no later than 30 days after Code Enforcement sends the letter, an inspector either contacts the complaining party to determine if the violation has been corrected or conducts a field inspection to determine compliance. When compliance has been achieved, or if no further action is possible, the inspector 'dead files' the complaint.

Unfranchised Haulers

Section 9.10.1610 of the Municipal Code stipulates that only authorized haulers may collect and/or transport solid waste in the City. Specifically:

It is unlawful for any person to engage in the business of collecting, or transporting, or disposing of commercial solid waste kept, accumulated or generated in the city unless:

A. A franchise therefor has first been granted pursuant to the provisions of this part and such franchise is in full force and effect; and

B. A written franchise agreement therefor has been executed between such person and the city and such agreement is in full force and effect.

To inform the public of this requirement, IWM places regular notices in local newspapers, is considering a radio campaign, and has issued mailings in coordination with the Santa Clara Valley Manufacturing Group. IWM also gets tips about unfranchised activity from franchised haulers. Programmatic responsibility for issuing franchises and monitoring franchised haulers rests with IWM, but responsibility for enforcing Municipal Code Section 9.10.1610 rests with Code Enforcement.

Our review revealed that neither IWM nor Code Enforcement has had an aggressive program to identify unauthorized haulers and ensure their compliance with Municipal Code regulations. Code Enforcement recently sent letters to 7 unfranchised companies that advertised commercial roll-off bin services in San Jose from a list that IWM provided to them. As a result, one previously unfranchised company has applied for franchise consideration. However, Code Enforcement has not followed up on these letters with second contacts or site visits, and has no procedure for doing so unless they receive a second report or complaint. Meanwhile, we identified more than 30 potential unauthorized haulers in an independent review of the phone book and local newspapers. These potential unauthorized haulers advertised under “Hauling”, “Waste Disposal – Nonhazardous”, or “Rubbish Containers & Hauling” services.

In the past, a lack of clear enforcement authority, and some confusion about the division of responsibility between IWM and Code Enforcement made enforcement difficult. For example, one hauler we interviewed had physically trapped an unfranchised hauler’s truck in a driveway. He told us that he called IWM on his cellular phone, and that IWM, which does not have enforcement authority, called Code Enforcement for help. Code Enforcement did not respond to this incident because the inspector did not consider enforcement against unauthorized collection to be part of his

responsibility. In June 1997, Code Enforcement Inspectors were empowered to issue administrative citations against unfranchised haulers. The penalty amount attached to the citation is \$500. To date, Code Enforcement has not issued any citations. It should also be noted that in July 1997, the City Council authorized a new Code Enforcement Inspector position to coordinate citywide solid waste issues.

Code Enforcement officials have recommended that, before embarking on an aggressive enforcement campaign, the City should weigh the cost of enforcement against the additional revenues from fees imposed on franchisees. Our review revealed that potential revenues could include both CSW franchise and AB 939 fees. However, many unfranchised CSW haulers may be exempt from CSW franchise fees because of their size (the first 43,000 cubic yards of CSW is exempt from franchise fees). Nonetheless, unfranchised CSW haulers would clearly owe CSW AB 939 fees of \$1.77 per cubic yard. We estimate that for every one percent of total CSW activity that unfranchised hauling constitutes, the City loses \$80,000 in CSW AB 939 fees for the IWM Fund.

As a result, it appears that an aggressive campaign against unfranchised CSW haulers would be cost beneficial. Moreover, in our opinion, it is the City's responsibility to ensure that the franchising requirements it imposes on CSW haulers are evenly enforced, and that the City collects all of the CSW franchise and AB 939 fees to which it is entitled. Otherwise the CSW franchising system is not fair to those CSW haulers that do comply with City requirements.

#9 We recommend the Administration prepare a work program to actively pursue unfranchised CSW haulers. Specifically, the Administration should: (1) clarify which department is responsible for identifying and making the initial contact with potential unfranchised haulers; (2) enlist the cooperation of franchised CSW haulers to locate unfranchised haulers who are evading the CSW franchise and AB 939 fees that other haulers must pay; (3) set the level of documentation for referral of a potential unfranchised hauler to Code Enforcement; and (4) clarify policies and procedures for citing unfranchised haulers including the level of documentation for issuance of a citation. (Priority 2)

Scavenging

Municipal Code section 9.10.740 prohibits scavenging of recyclables. Specifically, *No person, other than an authorized recycling collector, shall remove recyclable material that has been placed in a designated recycling collection location. Any and each such removal in violation hereof from any designated recycling collection location shall constitute a separate and distinct offense.*

Scavenging is a common problem in any jurisdiction with a recycling program. Scavenging is theft of a hauler's property, results in a loss of revenue to the hauler, and often involves trespassing on private property.

In a January 16, 1997, memorandum to the City Council, Councilmember Pandori called for a more active City role in providing education about scavenging and enforcing anti-scavenging regulations. Among other things, Councilmember Pandori recommended designating staff specifically for enforcement, stopping the processing of scavenged materials at buy-back centers, educating customers about proper setouts, and educating buy-back centers to detect obvious violators.

In response, the ESD noted that anti-scavenging efforts are not included in either the ESD's or Code Enforcement's current workplans. The City Manager proposed conducting a Recycle Plus opinion survey regarding scavenging, and a coordinated effort between Code Enforcement and the ESD to better track and understand scavenging complaints. The Administration recently established a working group of representatives from Code Enforcement, the ESD, the SJPd, and haulers. However, the working group has met only once, and has not established a project completion date.

Several City departments receive calls about scavenging. Customer Service Representatives (CSRs) at the City's Utility Billing System receive a couple of calls per month about scavenging. The CSRs tell the caller to contact Code Enforcement and provide the caller with Code Enforcement's phone number. The SJPd also receives a couple of calls per month. The SJPd records the complaint and then notifies Code Enforcement of the complaint. In addition, Police Dispatchers refer the complaint to patrol officers who, at their discretion, do a 'roll by' of the area if time permits or contact the complaining party if requested to do so. Altogether, Code

Enforcement records indicate that the City received 141 scavenging complaints from citizens from January 1996 through September 1997.

Our review revealed that the effectiveness of Code Enforcement's current response to scavenging complaints is limited. Specifically, our review revealed that Code Enforcement was only able to follow-up on 47 out of 141 scavenging complaints made to Code Enforcement from January 1996 through September 1997. A Code Enforcement Inspector handled these 47 cases by writing a letter to the 'responsible party'. This was possible in these cases only because the complaining party gave an address or noted a vehicle license number and Code Enforcement used the license number to identify the 'responsible party'. Code Enforcement 'dead filed' the remaining 94 complaints because the complaining party did not provide sufficient information about the scavenger. In our opinion, this is not the level of customer service that citizens have a right to expect from the City when they make a complaint.

According to Code Enforcement, an aggressive anti-scavenging enforcement campaign may not be cost beneficial. As was noted above, complaining parties frequently do not provide sufficient information about scavengers. In addition, scavengers are difficult to prosecute because of the unwillingness of witnesses to testify. Further, according to Code Enforcement, the Environmental Enforcement Division of the ESD incurred substantial overtime costs conducting several weeks of surveillance in targeted areas during 1994-95. The end result of this effort was that the ESD only issued six citations for scavenging, the cited individuals failed to appear in court, and the court issued \$50 bench warrants.

Adding to the difficulty of pursuing scavengers is the fact that scavenging is a misdemeanor violation. As such, scavenging requires a misdemeanor citation, and Code Enforcement Inspectors have been instructed that misdemeanor citations should be issued based on an on-view violation. In other words, Code Enforcement Inspectors must actually see the scavenging take place. This creates enforcement problems because Code Enforcement Inspectors are not typically available to patrol the streets in the middle of the night or early morning hours when scavengers are most active.

Meanwhile, haulers and citizens have continued to register their complaints about scavenging. At a March 1997 City Council meeting, haulers reiterated their concern about

scavenging, demanded that the City enforce its Municipal Code regulations against scavenging, and offered to provide the City with information regarding where and when scavenging occurs so that Code Enforcement can effectively allocate resources to cite violators. Although many citizen complaints about scavenging relate to individuals, the haulers are particularly concerned about organized groups intent on arriving ahead of the authorized collection trucks because these groups pose the greatest financial risk to haulers.

According to the City's Recycle Plus contractors, the degree of scavenging fluctuates with the price of commodities. As of September 1997, commodity prices are down, and scavenging is less of a problem. However, a few years ago, when commodity prices were high, one of the contractors estimated that it was losing from \$243,000 to \$298,000 per year to scavengers. This is of concern to the City because if the contractors' yields on recyclables go down, it could affect Recycle Plus contract negotiations in the future.

#10 We recommend that Code Enforcement (1) track complaints by location and solicit hauler input as to locations where scavenging occurs, and (2) refer scavenging complaints to Police Dispatch for referral to patrol officers who have authority to issue citations and could, at their discretion, do a 'roll by' of the area when scavengers are most likely to be active. (Priority 2)

CONCLUSION

Our review revealed that the City has not aggressively enforced Municipal Code provisions regarding unfranchised haulers, and that the City's response to complaints about scavenging has been limited. Unfranchised CSW haulers cause a loss of CSW franchise and AB 939 fees to the City. Scavenging results in a loss of revenue to the Recycle Plus contractors and other commercial haulers of recyclables. In our opinion, the Administration should reassess the division of responsibility between the ESD, Code Enforcement, and the SJPD, and determine the most effective way to actively pursue scavengers and unfranchised haulers.

RECOMMENDATIONS

We recommend that the Administration:

Recommendation #9:

Prepare a work program to actively pursue unfranchised haulers. Specifically, the Administration should: (1) clarify which department is responsible for identifying and making the initial contact with potential unfranchised haulers; (2) enlist the cooperation of franchised CSW haulers to locate unfranchised haulers who are evading the CSW franchise and AB 939 fees that other haulers must pay; (3) set the level of documentation for referral of a potential unfranchised hauler to Code Enforcement; and (4) clarify policies and procedures for citing unfranchised haulers including the level of documentation for issuance of a citation. (Priority 2)

In addition, we recommend that Code Enforcement:

Recommendation #10:

(1) Track complaints by location and solicit hauler input as to locations where scavenging occurs, and (2) refer scavenging complaints to Police Dispatch for referral to patrol officers who have authority to issue citations and could, at their discretion, do a 'roll by' of the area when scavengers are most likely to be active. (Priority 2)

FINDING IV

THE ESD SHOULD IMPROVE ITS OVERSIGHT OF \$9.8 MILLION IN RECYCLE PLUS INCENTIVE PAYMENTS

To encourage recycling, the City allows its Recycle Plus haulers to keep all proceeds resulting from the sales of recyclables that they collect. In addition, the City pays the haulers an incentive payment for each ton of recyclables they recycle. During 1996-97, incentive payments totaled \$9.8 million. The haulers invoice the City on a monthly basis for these incentive payments. Because a portion of the invoiced amount is for unconfirmed tonnages, both the City and the haulers make adjustments to incentive payment amounts in subsequent periods. The City also audits the incentive payment transactions on a periodic basis. In spite of this complicated review, we found discrepancies between total tonnages that USA Waste of San Jose (USA Waste), previously known as Western Waste Industries, confirmed as recycled and their adjusted incentive payment amount. As a result, the City may have overpaid USA Waste \$14,109.92 for the period from July 1995 through December 1996. Although this difference is less than 0.4 percent of USA Waste's incentive payments during that period, no difference should exist. In our opinion, the incentive payment process can be simplified and streamlined to ensure that both the City and its haulers properly account for Recycle Plus incentive payments.

The City Pays The Recycle Plus Haulers An Incentive For Each Ton Of Materials They Recycle

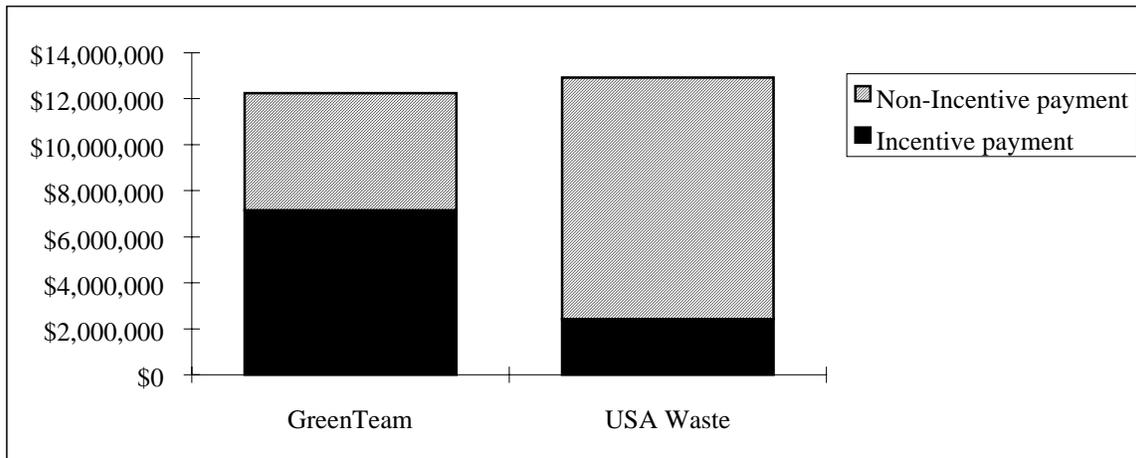
The City pays its Recycle Plus haulers -- GreenTeam and USA Waste -- for performing various garbage and recycling services. To encourage recycling, the City allows haulers to keep all sales proceeds (salvage revenue) of recyclable materials. Both haulers process and market the recyclables they collect to various buyers of aluminum cans, newspaper, glass, scrap metal, mixed paper, and plastic material. Before transporting the materials to these buyers, the haulers weigh the recyclable materials and issue weight tags. The buyers re-weigh the materials upon receipt and pay the hauler an agreed upon price per ton.

To further encourage recycling, the City pays the haulers an incentive payment for each ton of recyclable materials that they actually recycle. The haulers request reimbursement per ton of recyclables sold on their monthly invoice to the City. During 1996-97, the City paid its haulers approximately \$9.8 million in recycling incentive payments.

As shown in Chart 2, the City paid GreenTeam \$7.3 million for recycling 26,100 tons of materials; this was 58 percent of its \$12.5 million in compensation. In addition, the City paid USA Waste nearly \$2.6 million for reselling 42,500 tons of recyclables; this was 19 percent of its \$13.2 million in compensation.

CHART 2

**TOTAL 1996-97 GREENTEAM AND USA WASTE
NON-INCENTIVE AND INCENTIVE PAYMENTS**



It should be noted that although USA Waste collected and recycled more material than GreenTeam during 1996-97, their incentive payment total was less. This is because USA Waste's compensation rate was \$60.02 per ton of recycling versus GreenTeam's compensation rate of \$277.80 per ton of recycling.

**The Incentive Payment Is Partly Based
On Unconfirmed Tonnages Of Recyclables**

Article 14 of the Recycle Plus agreements specifies the compensation method for the recycling incentive payment. Section 14.02 of the agreement provides that, "*the City shall pay Contractor for each ton of Recyclables Contractor **has recycled** subject to...tonnage limitations.*" [Emphasis added.] During an average month, USA Waste usually makes about 325 recyclable sales transactions and GreenTeam makes less than 150 transactions. Both contractors maintain records of each recyclable transaction including weight tags and sales data.

Each month, the Recycle Plus haulers invoice the City for the tonnage of recyclable material that they sold during the month. In many cases, the transactions are complete – that is, the buyers have confirmed the weight of the shipment and paid the hauler for the materials they received. However, the haulers also invoice the City for transactions that are not complete – that is, the hauler shipped the materials to the buyer but the buyer had not paid for the materials they received. As a result, the invoices that the City receives from the haulers are based on both confirmed sales and unconfirmed tonnages of shipped materials for which the hauler had not been paid.

Because some transactions are based on unconfirmed tonnages, IWM requires the haulers to adjust their incentive payments in subsequent periods once confirmed weights can be documented. This adjustment process is important because there are frequent discrepancies between the haulers' weight tickets and the tonnages that buyers actually agree to pay the haulers. Commonly, moisture changes or contamination in the loads cause these discrepancies. For example, a shipment of newspaper may get wet during the winter or the recyclables may contain contamination.

ESD Auditors Review The Accuracy Of Incentive Transactions

The current IWM practice is to pay the incentive payment based on the hauler's invoice. The contractors provide the ESD with a sales activity detail report that lists each recyclable sales transaction initiated during the month. The report shows:

- Shipping information including type of material, buyer, shipping date, shipping weight and weight tag number, estimated price per ton, invoice number, and expected revenue; and
- Record of revenue received including weight paid, revenue received, date paid, and check number.

ESD auditors from the Administrative Services Division's Audit Unit (Audit Unit) use these reports to select either a random or a judgmental (that is, non-statistical) sample of recycling transactions, review the documentation for those transactions, verify the tonnage recycled, and make adjustments to those transactions as necessary.

Timeliness Of Adjustments Has Been An Issue

The haulers are required to report and make appropriate adjustments to their incentive payments when there are discrepancies in tonnage. These adjustments appear on subsequent invoices. During the period of our review, GreenTeam made monthly adjustments to their incentive payment, and the Audit Unit did not recommend any further adjustments. On the other hand, USA Waste only reported adjustments sporadically, taking from 3 to 11 months after the end of the quarter to report adjustments. Moreover, our review revealed that the Audit Unit took anywhere from 3 to 16 months after the end of the quarter to make their audit adjustments, recommended numerous adjustments to USA Waste’s incentive payments both before and after the hauler reported their adjustments, and audited some periods more than once. As a result, incentive payment adjustments for USA Waste took as long as 16 months. Table 7 shows the timing of both the USA Waste and Audit Unit adjustments.

TABLE 7

**USA WASTE AND ESD AUDIT UNIT ADJUSTMENTS
OF 1995-96 INCENTIVE PAYMENT TRANSACTIONS**

Quarter	Time Period	Date Of ESD Audit Unit Adjustments	Date Of USA Waste Adjustments
1	July 1995 to September 1995	February 1996	August 1996
2	October 1995 to December 1995	May 1996	August 1996
3	January 1996 to March 1996	June 1996, July 1997	June 1996, January 1997
4	April 1996 to June 1996	November 1996, December 1996, July 1997	June 1996, January 1997

It should be noted that the timeliness of contractor adjustments is driven by delays in obtaining confirmation and/or payment from the recyclable buyers. According to USA Waste’s Controller, the time to obtain payment varies from buyer to buyer and can take anywhere from 14 days to 180 days. However, our review revealed that during one 3-month period, USA Waste received payment an average of 30 days after shipping with a maximum delay of 101 days after

shipment. In our opinion, haulers should be able to make final adjustments to confirmed tonnages within six months of shipment.

It should also be noted that during 1994-95, USA Waste felt it had an understanding with the ESD that an annual adjustment would suffice. USA Waste felt it had a different understanding with the ESD from July 1995 through December 1996 such that it was to make quarterly incentive payment adjustments. Finally, in January 1997, the ESD and USA Waste agreed that USA Waste would make and report monthly adjustments to its incentive payment transactions. We did not include any periods after January 1, 1997 in our analysis.

Adjustments Were Incomplete In Some Months And Duplicative In Other Months

Our review also revealed that in spite of all this adjustment activity, no one ever reconciled the net incentive payment (after adjustments) to the tonnage that USA Waste had documented that it had recycled in the final monthly sales activity detail reports that it submitted to the City. Specifically, ESD auditors only recommended adjustments to the specific few transactions that they audited. In addition, both the hauler's and the ESD's adjustments were incomplete in some instances and probably duplicative in others. As a result, neither the ESD nor the hauler apparently realized that there remained an unreconciled difference between the net tonnage that the City paid, and the net tonnage that USA Waste could document that it recycled.

Using USA Waste's monthly invoices and notices of subsequent adjustments, we determined that the City had paid USA Waste for 40,751.02 tons of recyclables during 1995-96. However, using final sales activity and audit reports, we determined that USA Waste could document that it had recycled at least 40,905.59 tons during 1995-96, or 154.56 tons more than the tons for which the City had paid. As a result, we estimate that the City underpaid USA Waste \$9,221.05 (154.56 tons at \$59.66 per ton) for the period from July 1995 through June 1996. Conversely, we determined that the City has paid USA Waste for 20,589.25 tons of recyclables during the first half of 1996-97, but that USA Waste has only documented that it recycled 20,200.53 tons during that period. Therefore, we calculate the City overpaid USA Waste \$23,331.97 (388.72 tons at \$60.02 per ton) for the period from July 1996 through December 1996.

As Table 8 shows, we calculate that the City overpaid USA Waste as much as \$14,109.92 for the period from July 1995 through December 1996.

TABLE 8
SUMMARY OF USA WASTE
NET TONNAGE PAID AND CONFIRMED

	July 1995 to June 1996	July 1996 to December 1996	Total
INCENTIVE PAYMENT TONNAGE			
USA Waste invoiced tonnage	41,522.52	20,608.28	62,130.80
IWM adjustments to original invoice (in tons)	(21.92)	0	(21.92)
ESD audit adjustments to subsequent invoices (in tons)	(284.63)	(24.33)	(308.96)
USA Waste adjustments to subsequent invoices (in tons)	<u>(464.95)</u>	<u>5.30</u>	<u>(459.65)</u>
Net tonnage paid	40,751.02	20,589.25	61,340.27
TONNAGE CONFIRMED			
Tonnage confirmed as recycled (per most recent sales transaction report)	40,878.16	20,196.96	61,075.12
ESD audit corrections to audited sales transaction report (in tons)	<u>27.43</u>	<u>3.57</u>	<u>31.00</u>
Net confirmed tonnage	40,905.59	20,200.53	61,106.12
Difference (in tons)	154.56	388.72	234.16
Incentive payment rate per ton recycled	X \$59.66	X \$60.02	
Calculated amount the City overpaid USA Waste	<u>(\$9,221.05)</u>	<u>\$23,331.97</u>	<u>\$14,109.92</u>

It should be noted that the \$14,109.92 shown above includes \$8,384 in credits the Audit Unit recently recommended that the ESD give to USA Waste for 1996 transactions. Absent those ESD-generated credits, the City would have overpaid USA Waste only \$5,725.92 for the period we reviewed. It should also be noted that the 234.16 ton difference is less than 0.4 percent of the 61,340.27 tons that the City paid USA Waste during that period.

In our opinion, IWM contract managers and the ESD's Administrative Services Division should work with the haulers to tabulate the net tonnage invoiced by transaction month, and reconcile those payments to the final confirmed tonnage shown on the haulers' detail sales activity

reports by month. Further, the Audit Unit should assess the accuracy of the haulers' final detail sales activity reports for each month, recommend adjustments to individual transactions as necessary, and reverify that the net tonnage the haulers recycled equals the net tonnage the City paid. In this way, both the City and the haulers can be assured of accurate, complete, and timely adjustments to incentive payments without having to require additional paperwork.

#11 We recommend the ESD develop policies and procedures to ensure that the: (1) monthly incentive payment adjustments that the Recycle Plus haulers submit are accurate, complete, and timely; (2) track net incentive payments adjustments and reconcile those payments to the final monthly detail sales activity reports that haulers submit; and (3) periodically review a sample of transactions to assess the accuracy of the detail sales activity reports and reverify that the reports support the net incentive payments to the haulers. (Priority 2)

As shown in Table 8, the City may have overpaid USA Waste \$14,109.92 for incentive payment transactions from July 1995 through December 1996. This does not include prior or subsequent periods. In addition, this amount does not include tonnage from transactions that the hauler listed as unconfirmed on the documentation that they submitted to the City. For example, the hauler's records for April 1996 indicate that they may have shipped an additional 91 tons of recyclable materials for which they were not paid. If USA Waste can document to the City's satisfaction that the materials were recycled, then USA Waste could request incentive payments from the City for these transactions. In our opinion, the ESD should prepare a complete reconciliation before making a final adjustment.

#12 We recommend the ESD prepare a complete reconciliation of USA Waste recycling incentive payments before making a final adjustment. (Priority 2)

CONCLUSION

Our review revealed that in spite of numerous adjustments to Recycle Plus hauler incentive payments, the ESD never verified that the net amount paid reconciled to the confirmed tonnage that USA Waste recycled. As a result, the City may have overpaid USA Waste \$14,109.92 for

recycling transactions from July 1995 through December 1996. In our opinion, this process can be simplified so that both parties have assurance that adjustments are accurate and timely.

RECOMMENDATIONS

We recommend that the ESD:

Recommendation #11:

Develop policies and procedures to ensure that the: (1) monthly incentive payment adjustments that the Recycle Plus haulers submit are accurate, complete, and timely; (2) track net incentive payments adjustments and reconcile those payments to the final monthly detail sales activity reports that haulers submit; and (3) periodically review a sample of transactions to assess the accuracy of the detail sales activity reports and reverify that the reports support the net incentive payments to the haulers. (Priority 2)

Recommendation #12:

Prepare a complete reconciliation of USA Waste recycling incentive payments before making a final adjustment. (Priority 2)

OTHER PERTINENT INFORMATION

ESTIMATING THE COST OF A CONTAINERIZED YARDWASTE COLLECTION SYSTEM

At the request of the City Council, we reviewed the Environmental Services Department's (ESD) cost estimates of containerized yardwaste collection. When preparing its 1993 estimate of the cost of containerized yardwaste collection service for the City Council's Environment Committee, the ESD estimated that containerized service would cost \$18.5 million, or \$8.4 million more per year than on-street service. Our review revealed that the number of service recipients per collection route, assumed residue percentages, and container costs have changed in the interim. As a result, we estimate that current containerized collection costs may be as much as \$5.2 million less than previously estimated. Current yardwaste collection contracts run through the year 2002. As a result, the City cannot revisit the issue of containerized yard waste collection services until that time.

The ESD's November 1993 Comparison Of Yardwaste Collection Costs

San Jose residents have unlimited on-street yardwaste collection service as part of the Recycle Plus program. In August 1993, the City Council directed the Administration to review the potential implementation of a containerized yardwaste collection program. In November 1993, the ESD reported to the Environment Committee that the current on-street yardwaste program was "extremely successful" in achieving the City's diversion goals, was highly regarded by San Jose residents, and had achieved a participation rate of 80 percent. The ESD also reported that the public wanted reduction or elimination of yardwaste residue, and a solution to the early setout problem.

One solution to these problems could have been a containerized yardwaste collection system. In a November 4, 1993, memorandum to the Environment Committee, the ESD presented a cost comparison of on-street versus containerized collection of yardwaste. The ESD estimated that containerized collection would cost \$18.5 million per year compared to \$10.1 million for on-street collection -- a difference of \$8.4 million per year. Table 9 shows this comparison.

TABLE 9

**THE ESD'S 1993 COMPARISON OF TOTAL ANNUAL
COLLECTION COSTS FOR ON-STREET VERSUS
CONTAINERIZED YARDWASTE COLLECTION SYSTEMS**

<u>Cost Component</u>	<u>Current Street Collection System</u>	<u>Containerized Collection System</u>	<u>Cost Difference</u>
Collection Costs	\$8,170,000	\$13,318,000	\$5,148,000
Container Costs	- 0 -	3,151,000	3,151,000
Processing Costs	1,888,000	1,888,000	- 0 -
Landfilled Residue	10,000	139,000	129,000
TOTAL	\$10,068,000	\$18,496,000	\$8,428,000

As shown above, the ESD estimated that containerized collection would cost \$8,428,000 more than the current on-street collection system. Consequently, the ESD recommended increasing public education and enforcing early setouts, instead of pursuing a more expensive containerized collection system.

There are key differences in the collection requirements for on-street and containerized yardwaste systems. The current street collection system utilizes a two-person crew to operate a rear end loader truck (REL) and claw tractor. The claw tractor collects the yardwaste, piled loose in the street, and deposits the debris in the back of the REL truck. Under a containerized system, one driver operates a side arm loader truck (SAL) for lifting and emptying out the container, similar to the way residential solid waste is collected. Therefore, it takes a one-person crew to complete a single route under a containerized system, while it takes a two-person crew to complete a route under the street collection method.

In its November 1993 memorandum to the Environment Committee, the ESD estimated an annual cost of \$88,400 per route for the current on-street system versus a \$51,200 annual cost per collection route under a containerized system. The ESD assumed that under a containerized system, a single collection route could serve about 800 households per day, compared to 2,291 households per collection route under the street system. The ESD estimated that the on-street system would require 16 collection routes per day at a cost of \$8.2 million per year. The ESD also

estimated that a containerized system would require 45 collection routes per day at a cost of \$13.3 million per year or \$5.1 million more than the on-street system. In addition, the ESD identified \$3,151,000 in increased container costs and \$129,000 in increased landfilled residue costs.

Containerized Yardwaste Collection Cost Factors Have Changed

Our review revealed that the following cost elements of the 1993 cost comparison study might have changed in the interim:

Collection Costs

In the 1993 cost comparison study, ESD staff estimated that if a containerized system were implemented, the number of collection routes would almost triple -- from 16 routes to 45 routes per day. At that time, the ESD assumed that each route could serve 800 households per day. However, according to the solid waste professionals we contacted, SAL trucks could collect up to 1,200 households per route. For example, BFI representatives told us that in Fremont and Milpitas, SAL trucks collect yardwaste containers from 1,000 and 1,100 households per day, respectively. As a result, in our opinion, a containerized system in San Jose may not require 45 routes per day. Instead, it may require from 30 to 36 routes per day. We estimate that this could reduce the estimated cost of containerized collection by about \$2.7 to \$4.4 million.⁵

Container Costs

In 1993, the ESD estimated that the City would need to purchase 186,000 containers at a cost of \$11.4 million (\$2.8 million for 5 years). In 1993, the ESD estimated that the 96-gallon containers would cost \$61 each. However, an industry representative told us that because of other market factors, the cost of similar-sized garbage containers has declined to about \$45 per container in 1997. We estimate that this could reduce the estimated annual cost of containerized collection by \$700,000.

⁵ We assumed 180,000 households (36,000 households collected per day), 1,000 to 1,200 households per daily collection route, and used the ESD's 1993 cost estimate of \$51,200 per annual collection route. Actual costs would depend on current labor and equipment estimates.

Landfilled Residue Costs

In its 1993 cost comparison, the ESD estimated that landfill costs for residue would increase from \$10,000 to \$139,000 under a containerized system. The ESD reported that in 1993 other communities with containerized collections had residue rates of 5 percent to 15 percent. Therefore, the ESD assumed that residue could increase from 0.75 percent to 5 percent to 15 percent under a containerized system. As a result, the ESD estimated that residue tons could increase from 638 to 8,500 tons per year – an increase of over 1,200 percent. However, BFI officials told us that based on their recent experience in the cities of Fremont and Milpitas, the residue rate is about 1 percent and 5 percent, respectively, for containerized collection. Therefore, in our opinion a residue rate of 10 percent may be unlikely. We estimate that a 5 percent residue rate could reduce the estimated annual cost of containerized collection by about \$70,000.⁶

CONCLUSION

In 1993, the ESD estimated that containerized yardwaste collection service would cost \$18.5 million, or \$8.4 million more per year than on-street service. Our review revealed that the number of service recipients per collection route, assumed residue percentages, and container costs have changed in the interim. As a result, we estimate that current containerized collection costs may be as much as \$5.2 million less than previously estimated. However, current yardwaste collection contracts run through the year 2002. As a result, the City cannot revisit the issue of containerized yard waste collection services until that time.

⁶ We assumed that a 5 percent residue rate would result in 4,250 tons of residue with a disposal cost of \$16.40 per ton.